

REMARKS

Claims 1 through 49, all the original claims, are deleted, and Claims 50 to 95 added.

Of the deleted claims, Claims 46-49, drawn to the Examiner's invention II, a method of manufacturing a photocatalytic member, stand withdrawn from consideration as drawn to a non-elected invention. Cancellation is made without prejudice to the filing of a divisional application.

Claims 1-45 are submitted in reworded form as Claims 50-94. The number of a reworded claim is 49 higher than the corresponding original claim. Thus Claim 50 corresponds to original Claim 1, Claim 51 to original Claim 2, and so on. Claims 50 to 53, 55, 56, 58, 61, 62, 65 to 68, 70, 71, 73, 76 and 77 correspond to the rejected claims. New Claim 95 depends from Claim 1 and is readable on the elected species. The remaining claims are non-elected species claims.

New Claim 95 is drawn to a structure with dimensions to give a desired optical interference or diffraction coloration effect. This requires that alternating layers have an optical thickness of $\lambda/4$, where λ is the wavelength of the desired color. Support appears in the specification starting at page 7, line 24, over to page 8, line 22, and at page 9, the paragraph at line 14.

New Claim 50 specifies that the two types of laminated layers, the photocatalytic and support alternate. Basis appears at page 7, line 7, and elsewhere as in the figures of the drawings.

Claim 50 also employs the designation "space" in place of "vacant layer." The space is indicated to be left between two adjacent photocatalytic layers and next to a support layer, basis being inherent in the disclosure and page 5, paragraph at line 9, and at page 9, the paragraphs at lines 14 and 19.

The support-photocatalytic layer contact areas is indicated to be smaller than the area of the contacted photocatalytic layer. Basis appears in the paragraph noted above, note particularly, page 9, lines 23-27. The space is left because of this smaller contact area.

Claim 51 differs from original Claim 2 in stating precisely that a space communicates with an opening which is through a photocatalytic layer. Basis appears in the paragraph at page 5, line 9.

The language of Claim 58 finds basis in the paragraph [0017], bridging pages 4 and 5.

The other claim changes are editorial in nature. In particular, the language “is used as” is replaced by appropriate language.

The specification is amended at pages 6 and 10 to correct obvious errors relating to description of the drawings.

The specification is amended at pages 4 and 9 to indicate that “space” is equivalent to the original term “vacant layer”. The abstract of the invention is reworded to be more in conformance with present claim language.

CLAIM REJECTIONS

Reconsideration and withdrawal of the rejection of the claims under 35 U.S.C. § 112, second paragraph, as set forth in paragraph 3 of the Official Action are requested.

New Claim 50, corresponding to original Claim 1, now sets forth the structural cooperative relationships. The films of the laminate member are stated to be alternating photocatalytic and support layers and the claim specifies spaces next to support layers between adjacent photocatalytic layers.

The criticism of “vacant layer” appearing in the Official Action would appear to be removed by the use of the term “space”, as suggested in the Official Action. The new term is included in the specification for clarity. There is clearly no new matter added.

The criticism of claims in relationship to the vacant layers (now spaces) and the openings would appear to be overcome by the language of Claim 51. The opening is defined and the space is said to communicate with it. A space will communicate with the outside through an opening as well as along the periphery when the support layers are centered, as specified in Claim 55 corresponding to original Claim 9.

Concerning Claim 9 (rewritten as Claim 58), since new Claim 58 depends from Claim 51, it would appear to overcome the criticism. The support layers are disposed at the center of the spaces to support the photocatalytic layers and thus maintain the intervening spaces. The Claim 58 clearly specifies that it is the support layers that have the designated cross-section.

CLAIM REJECTIONS - 35 U.S.C. § 102

Reconsideration and withdrawal of the rejection of Claims 1-4, 7, 9, 12, 13, 16-19, 21, 22, 24, 27, and 28 under 35 U.S.C. § 102(b) as being anticipated by Chattha et al (5,102,853), as applied to the present claims are requested.

Claim 50 (corresponding to original Claim 1) specifies that photocatalytic layers alternate with support layers. No such structure appears in Chattha. Titanium oxide in Chattha is supported on alumina. Palladium, also supported on alumina, is not asserted in the Official Action and it is certainly not a support for the titanium oxide. It is not adhered to the titanium oxide as would be required if it were to be a laminated support layer as the subject claims specify.

The remaining claims corresponding to the rejected claims, are all dependent from Claim 50 directly or indirectly.

Nor does Chattha et al disclose a laminate deposited on a substrate. Hence, in Chattha et al there is no uppermost and lowermost layer with respect to the substrate.

Reconsideration and withdrawal of the rejection of Claims 1, 3, 4, 12, 16, 18, 19 and 27 under 35 U.S.C. § 102(b) as being anticipated by Hums (4,847,234) as applied to the present claims are requested.

Hums does not disclose thin film laminae. The support of Hums corresponds to Applicants' substrate. Hence, no "support" for its titanium oxide undercoating exists. The undercoating is the support for the catalyst disposed thereon. The catalyst supports no other material. And there are certainly, in Hums, no spaces separating photocatalytic layers. No photocatalytic layer is identified in Hums et al.

Reconsideration and withdrawal of the rejection of Claims 1, 2, 4, 6, 7, and 9 under 35 U.S.C. § 102(b) as anticipated by Ford et al (3,931,049) are requested, as applied to the present claims.

The present structure is certainly not disclosed by Ford et al. No spaces separating photocatalytic layers and next to support layers are disclosed.

Note that, if nickel is a photocatalytic material as the Official Action asserts (without evidence thereof), there is only one nickel layer in Ford. The language of Claim 51, "space between adjacent photocatalytic layers" is thus not met by Ford, which language at the minimum would require two nickel layers.

Claim 95, reciting a structure leading to optical coloration is certainly not disclosed in any of the applied references.

Favorable reconsideration is solicited.

Respectfully submitted,

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IN THE SPECIFICATION

Please amend the specification as follows:

Page 4, please replace paragraph [0017] as follows:

[0017] The photocatalytic colored member may be formed by providing, upon a portion or the entire surface of the substrate, laminates consisting of the laminated thin-film layers of photocatalytic material and thin-film layers of support material which maintain the vacant layers, i.e., spaces, by means of thin-film layers of support material formed at the center having a circular, elliptical or polygonal cross section.

Page 5, please replace paragraph [0020] as follows:

[0020] The method of manufacturing a photocatalytic colored member according to the present invention comprises the steps of: laminating a plurality of layers of thin-film layers of photocatalytic material and thin-film layers of support material, forming a plurality of openings through a plurality of layers of the multi-layer film by means of physical dry etching with argon ions or the like, and next, using wet etching to remove excess support material to form, on the rear surface side of the thin-film layers of photocatalytic material, vacant layers or spaces adjacent to remaining support material that are open to the outside.

Page 6, please replace paragraph [0029] as follows:

[0029] FIG. 4(a) is a perspective diagram showing the state wherein the surface area of the laminated thin-film layers of photocatalytic colored member according to the present invention becomes larger [smaller] when going from the surface to lower layers.

Page 6, please replace paragraph [0031] as follows:

[0031] FIG. 4(c) is a perspective diagram showing the state wherein the surface area of the aforementioned laminated thin-film layers becomes [larger] smaller when going from the surface to lower layers.

Page 9, please replace paragraph [0044] as follows:

[0044] Thereafter, BHF is used to perform wet etching of the silicon dioxide film to form a vacant layer or space 10 on the back side of the thin-film layers of photocatalytic material 1. The thickness of this vacant layer 10 is the thickness of the silicon dioxide film serving as the layer of support material, so its thickness is $\lambda/4$.

Page 10, please replace paragraph [0048] as follows:

[0048] In addition, in the various aforementioned embodiments, the plurality of laminated thin-film layers of photocatalytic material 1 interspersed with thin-film layers of support material 2 all have equal surface areas, but they can also be formed such that the surface area of the thin-film layers of photocatalytic material 1 becomes larger [smaller] going from the surface toward the lower layers, as shown in FIG. 4(a). Or, they can also be formed such that the surface area becomes smaller [larger] going from the surface toward the lower layers, as shown in FIG. 4(c). Note that for the sake of comparison, FIG. 4(b) shows the photocatalytic colored body 3 of FIG. 1(b) above. Note that such laminates may be provided over the entire surface of the substrate, or only a single one may also be disposed.

IN THE CLAIMS

--1-49. (Cancelled).

50-95. (New).--

IN THE ABSTRACT

(New).